

# DR. EVA C. HERBST

## PERSONAL INFORMATION

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ADDRESS: Palaeontological Institute and Museum  
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[GoogleScholar](#) - [Github](#) - [Figshare](#) - [Publons](#)

## EDUCATION

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2016 - 2020 PhD in Biomechanics and Palaeontology  
*Structure and Motion Lab, Royal Veterinary College, London*  
Supervisors: Prof. John R. Hutchinson and Dr. Chris Richards

2012 - 2016 B.A. in Integrative Biology  
*U.C. Berkeley*

2013 - 2014 Degree of Higher Education in Biomedical Sciences  
*Durham University*  
Year of Study Abroad, Certificate of Higher Education

## EMPLOYMENT AND RESEARCH EXPERIENCE

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2019 - PRESENT Postdoc Palaeontological Institute and Museum, University of Zurich  
*investigating form and function of Triassic reptile skulls*

2019 - PRESENT Lead Researcher OATech+ Network Pump Priming Project  
*analysing bony architecture to monitor osteoarthritis of the knee*

2019 OATech+ Network Early Career Researcher Placement  
*osteoarthritis project, Prof. Andrew Pitsillides, Royal Veterinary College, London*

2016 - 2020 PhD in Palaeontology and Biomechanics  
*Structure and Motion Lab, Royal Veterinary College, London*

2016 National Science Foundation Research Experience for Undergraduates Project  
*Comparative Biomechanics, Palaeontology, and Evolution, University of Missouri*

2015 - 2016 Undergraduate Research Apprenticeship Program  
*Hummingbird Flight Analysis, U.C. Berkeley*

2014 - 2016 Research Assistant and Archivist  
*Human Evolution Research Center, U.C. Berkeley*

2013 - 2016 Research Intern and Staff  
*Safari West Osteology, Santa Rosa, California*

2014 - 2015 Undergraduate Research Apprenticeship Program  
*Rodent Mandible Morphology Project, U.C. Berkeley*

## HONORS AND AWARDS

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- 2021 **D. Dwight Davis Award, Society of Integrative and Comparative Morphology**  
Best student oral presentation in the Division of Vertebrate Morphology
- 2020 **Swiss Commission of Palaeontology Prize**  
Best presentation in palaeontology given at the Swiss Geoscience Meeting
- 2016 **Franklin M. Henry Award, Integrative Biology, UC Berkeley**  
Outstanding achievement in human performance and health research
- 2016 **Distinction in General Scholarship, UC Berkeley**  
Awarded to graduates achieving high grade point average
- 2013, 2015 **Dean's Honors, UC Berkeley**  
Awarded to graduates achieving high grade point average

## PEER-REVIEWED PUBLICATIONS

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- 2020 Ortega-Jimenez, V. M., **Herbst, E. C.**, Leung, M. S., and Dudley, R. Natural barriers: waterfall transit by small flying animals. *Royal Society Open Science*: 7201185
- 2019 **Herbst, E. C.**, Doube, M., Smithson, T. R., Clack, J., and Hutchinson, J. R. Bony lesions in early tetrapods and the evolution of mineralized tissue repair. *Paleobiology* 45(4)
- 2010 **Herbst, E. C.** and Hutchinson, J. R. New insights into the morphology of the Carboniferous tetrapod *Crassigyrinus scoticus* from computed tomography. *Earth and Environmental Science Transactions of The Royal Society of Edinburgh* 109(1-2)

## PREPRINTS

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- 2021 **Herbst, E. C.**, Felder, A. A., Evans, L. A. E., Ajami, S., Javaheri, B., Pitsillides, A. A. A new straightforward method for automated segmentation of trabecular bone from cortical bone in diverse and challenging morphologies. [BioRxiv](#)

## GRANTS AND FUNDING

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- 2020 **University of Zurich GRC Grant**  
Project: organized and hosted finite element analysis [seminar series and workshop](#) with over 200 participants and developed a [website](#) and [Github organisation](#) for sharing finite element modeling methods  
Funds: 10,000 CHF
- 2019 **OATech+ Biomechanics and Mechanobiology Pump Priming Fund**  
Project: Using 3D trabecular architecture as a biomarker to identify and monitor osteoarthritis of the knee  
Funds: 10,000 GBP
- 2019 **OATech+ Next Generation of OATech Leaders Fund**  
Placement with Prof Andrew Pitsillides at RVC to work on osteoarthritis project (see above)  
Funds: 3,000 GBP

## GRANTS AND FUNDING CONT.

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- 2019 **Royal Veterinary College Foreign Travel Fund**  
To present research at ICVM conference  
Funds: 300 GBP
- 2018 **Royal Veterinary College Foreign Travel Fund**  
To present research at SICB conference  
Funds: 300 GBP
- 2016 **Research Experience for Undergraduates, National Science Foundation**  
Biomechanics research internship with Prof. Casey Holliday and Prof. Kevin Middleton, University of Missouri  
Funds: 3,500 USD

## INVITED TALKS AND WORKSHOP

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- 2021 *Workshop: [how to clean 3D meshes in Blender FunkyMUG](#) (Functional Morphology Users Group). Online. [Recording available on Youtube](#)*
- 2021 *New methods support the possibility of a salamander-like walk in the Permian tetrapod *Eryops*. Comparative Zoology Lab, Humboldt University Berlin, and Natural History Museum Berlin, Germany.*
- 2020 *Investigating joint range of motion in salamanders and early tetrapods.*  
Evolutionary Morphology and Biomechanics Group, University of Liverpool, UK.
- 2019 *Computational analysis of the evolution of amphibian locomotor modes.*  
Postgraduate Research Day, Final Year PhD Session, Royal Veterinary College, London.
- 2017 *Functional morphology of *Crassigyrinus scoticus*: gaining insight into locomotor evolution in early tetrapods.*  
Postgraduate Research Day, Royal Veterinary College, London. (Poster)
- 2017 *Computational analysis of the evolution of amphibian locomotor modes.*  
Postgraduate Seminar Series, Royal Veterinary College, London.

## CONFERENCE PRESENTATIONS

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- 2021 **Herbst, E. C.**, Eberhard, E., Manafzadeh, A. R., Richards, C., Hutchinson, J. R.  
*New methods support the possibility of a salamander-like walk in the Permian tetrapod *Eryops*.* Society for Integrative and Comparative Biology Annual Meeting, Online.  
(Talk, winner of D. Dwight Davis Award Session)
- 2021 **Herbst, E. C.**, Bastiaans, D., Miedema, F.; Scheyer, T.M.; Lautenschlager, S. 2021.  
*How important is modeling tooth enamel in FEA comparisons of whole skulls? Comparing common simplifications with biologically realistic models.*  
Society for Integrative and Comparative Biology Annual Meeting, Online. (Poster)
- 2021 Bastiaans, D., **Herbst, E. C.**, Scheyer, T. M. Bringing fossils back to life: 3D cranial reconstructions of the highly flattened remains of thalattosauriformes.  
Society for Integrative and Comparative Biology Annual Meeting, Online. (Talk)

## CONFERENCE PRESENTATIONS CONT.

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- 2020 **Herbst, E. C.**, Eberhard E., Manafzadeh A. R., Richards C., Hutchinson J. R. 2020. Was the early tetrapod *Eryops* capable of a salamander-like walk? Developing new methods to test paleontological hypotheses about posture and gait. Swiss Geosciences Meeting, Online. (Talk, winner of Swiss Commission of Palaeontology Prize)
- 2020 Bastiaans, D., **Herbst, E. C.**, Scheyer, T. M. Re-fleshing fossils: cranial reconstructions of thalattosauriformes. Swiss Geosciences Meeting, Online. (Talk)
- 2020 Bastiaans, D., **Herbst, E. C.**, Webb, N. M., Haeusler, M. Scheyer, T. M. 3D Data, a gateway to open science: the FEZ initiative. OILS (Open Innovation in Life Sciences), Online. (Talk)
- 2020 Bastiaans, D., **Herbst, E. C.**, Scheyer, T. M. Virtual paleontology: a modern look at ancient material OILS (Open Innovation in Life Sciences), Online. (Talk)
- 2020 Bastiaans, D., **Herbst, E. C.**, Scheyer, T. M. Thalattosauriformes: schedelreconstructies van Triassische weirdos. NKVP (Nederlandse Kring van Vertebraten Paleontologen), Online (Talk).
- 2020 **Herbst, E. C.**, Felder, A. A., Evans, L. A. E. , Jahaveri, B., Ajami, S., Pitsillides, A. A. A new automated method of segmenting trabecular bone: investigating subchondral trabecular changes as a predictor of osteoarthritis at the joint surface. Bone Research Society Annual Meeting, Online. (Poster)
- 2020 **Herbst, E. C.**, Eberhard, E., Richards, C., Hutchinson, J. R. Comparing in vivo and ex vivo knee range of motion in salamanders: a new method for investigating joint mobility. CAMS-Knee OpenSim Workshop, ETH, Zürich. (Poster)
- 2019 **Herbst, E. C.**, Eberhard, E. A., Richards, C. T., Hutchinson, J. R. 2019. A new method for investigating joint mobility and its relevance for inferring locomotor evolution in early tetrapods. 12th International Congress of Vertebrate Morphology, Prague, Czech Republic, abstract doi:10.1002/jmor.21003 (Talk)
- 2018 **Herbst, E. C.**, Doube, M., Smithson, T. R., Clack, J., Hutchinson. J. R. Paleopathologies in Carboniferous tetrapods and the evolution of bone healing. Society of Vertebrate Paleontology, 78th Annual Meeting, Albuquerque, New Mexico. (Poster)
- 2018 C. M. Holliday, **Herbst, E. C.**, M. Jacoby, A. Smolinsky, K. Sellers. Morphometric and modeling approaches to understanding the evolution of pseudosuchian mandibular symphyses. Society of Vertebrate Paleontology, 78th Annual Meeting, Albuquerque, New Mexico. (Talk)
- 2018 **Herbst, E. C.** 2018. New elements discovered in the early tetrapod *Crassigyrinus scoticus*. DVM SICB Regional Meeting, Natural History Museum, London. (Talk)
- 2018 **Herbst, E. C.**, Smithson, T. R., Clack, J., Doube, M., Hutchinson. J.R. Bony lesions in early tetrapods and the evolution of bone healing. Society of Integrative and Comparative Biology Annual Meeting, San Francisco. (Talk)
- 2018 **Herbst, E. C.**, Smithson, T. R., Clack, J., Doube, M., Hutchinson. J.R. Bony lesions in early tetrapods and the evolution of bone healing. Society of Integrative and Comparative Biology Annual Meeting, San Francisco. (Talk)
- 2017 **Herbst, E. C.** and Hutchinson, J. R. New insights into the morphology of the Carboniferous tetrapod *Crassigyrinus scoticus* gleaned from computer tomography. The Early Tetrapod World: a one-day conference celebrating the career of Prof Jenny Clack FRS. University of Cambridge. (Invited Conference Talk)
- 2017 **Herbst, E. C.**, Smithson, T. R., Clack, J., Hutchinson. J. R 2017. Pathology in the early tetrapod *Crassigyrinus scoticus*. Progressive Palaeontology Annual Meeting, University of Leicester. (Talk)

## TEACHING

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### Teaching Positions

2021	Bio 262 Evolutionary Morphology of Vertebrates - Issues and Methods University of Zurich
2020	Bio 267, Paleobiology and Evolution of Vertebrates, University of Zurich
2016-2019	Research Skills Facilitator, Royal Veterinary College, London
2017-2018	Comparative Animal Locomotion Module, Royal Veterinary College, London

### Lectures

2021	<i>Using Computer Tools to Investigate Biomechanics of Animals.</i> Bio 262, University of Zurich
2020	<i>Using Computer Modeling to Investigate Biomechanics of Extinct Animals.</i> Bio267, University of Zurich

### Tutoring

2017 - 2019	Postgraduate Writing Tutor, Royal Veterinary College, London
2011 - 2012	Private Tutor (Writing, Math)

## TECHNICAL SKILLS AND PROGRAMS

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CT SEGMENTATION AND 3D MODELING	Mimics, Avizo, Blender, Rhino
ANALYSIS AND SCRIPTING	Matlab, Python, Java
FINITE ELEMENT ANALYSIS & MULTIBODY DYNAMICS	Hypermesh, Abaqus, Artisynth
BIPLANAR FLUOROSCOPY	Maya

## OPEN ACCESS WORK

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SHARED WORKFLOWS	<ul style="list-style-type: none"><li>• method for <a href="#">automatic segmentation of trabecular bone</a></li><li>• <a href="#">Blender remeshing guide</a> for FEA</li></ul>
FEZ INITIATIVE	Founder of <a href="#">Finite Element Zurich</a>
CT DATA	All CT stacks used in my papers are open access on <a href="#">Figshare</a>
TRAINING	Completed <a href="#">Open Life Science Program</a> fall 2020

## OUTREACH

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2020	<a href="#">Interview</a> with Real Scientists DE (in German)
2019	Outreach display, Early Tetrapod Evolution Night at the Vet College, Royal Veterinary College, London
2017	Outreach display, Early Tetrapod Evolution Annual Open Day, Royal Veterinary College, London
2017	Guest <a href="#">blog post</a> about <i>Crassigyrinus</i> on Anatomy to You blog
2013-2016	Comparative anatomy outreach events at Safari West Wildlife Park

## PROFESSIONAL DEVELOPMENT AND CERTIFICATES

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2020 [Open Life Science Course](#)  
2020 [SlicerMorph 3D Morphometrics Course](#)  
2019 Avizo Course 3DMAGINATION Ltd.  
2018 MatLab Fundamentals Course  
2017 Teaching and Learning in Higher Education Certificate Royal Veterinary College, London

## LANGUAGES

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ENGLISH: fluent  
GERMAN: fluent